EXECUTIVE SUMMARY

The Disposal Area Monitoring System (DAMOS), managed by the New England District (NAE) of the U.S. Army Corps of Engineers, conducts detailed monitoring studies to detect and minimize any physical, chemical, and biological impacts associated with dredging and dredged material disposal activities in New England. This report presents the results of a DAMOS monitoring survey conducted by Science Applications International Corporation (SAIC) in July 2002 at the historic Machias Bay Disposal Site (MADS) near Eastport, Maine. The objective of this survey was to document the distribution of historic dredged material on the seafloor and evaluate biological conditions within the disposal site.

Maintenance and improvement dredging of Bucks Harbor, Machiasport and the six-foot channel in the Machias River, was performed between 1971 and 1974, where a total estimated volume of 55,300 m^3 of dredged material was deposited at MADS, a 1230 × 1230 m area of seafloor situated in the central portion of Machias Bay. The July 2002 field operations mark the first monitoring survey conducted at MADS under the DAMOS program. The results of this survey will assist with assessing the suitability of MADS as a disposal site for the placement of material from future maintenance dredging projects in the region. As part of the July 2002 field effort, a precision bathymetric and side-scan sonar survey was performed to assess the distribution of historic disposed sediment. In addition, a Remote Ecological Monitoring of the Seafloor (REMOTS®) sediment-profile imaging survey was conducted to further delineate the spatial distribution of historic dredged material on the seafloor and assess the benthic recolonization status over the disposal site relative to two nearby reference areas.

The July 2002 bathymetry and side-scan sonar data indicated the presence of a historic sediment deposit on the seafloor at MADS. This roughly circular deposit located in the center of MADS had a maximum height of approximately 2 m and an estimated diameter of about 300 m on the seafloor. Side-scan sonar and REMOTS® sediment-profile data indicated that the surface of the historic disposal mound was composed of slightly coarser, denser surface sediments than the surrounding ambient sediment of Machias Bay, and appears to be a stable feature on the seafloor.

Surface sediments at most of the disposal site stations were composed of fine-grained (reddish-tan over gray) sediment that was comparable to the reference area sediments at 24 of the 25 REMOTS® sampling stations, and confirmed the depositional nature of the area. One station near the apex of the disposal mound exhibited a coarser deposit of historic dredged material of indeterminate depth. The surface sediments at that station indicate an armored mound surface of pebbles and shells. In addition, a significant

presence of mud clumps and clasts at the sediment surface of both the disposal site and reference area stations suggest this area is subject to some degree of physical disturbance, possibly due to lobster fishing activity.

The average depth of the apparent Redox-Potential Discontinuity (RPD) over MADS (1.7 cm) and at the nearby reference areas (1.9 cm) was considered indicative of moderately oxygenated surface sediments at the time of the July 2002 survey. The benthic community within the disposal site was similar to that observed at the reference areas, with both Stage I surface-dwelling and advanced Stage III deeper-dwelling infauna present within the surface sediments. Stage III activity (advanced, well-developed benthic community) was observed in 76% of the stations sampled within MADS, which is comparable to 80% for the stations sampled within the reference areas.

Benthic habitat conditions within MADS appear to be quite similar to the reference area stations, with overall Organism-Sediment Index (OSI) values of +5.3 and +5.9, respectively. These intermediate OSI values, generally indicative of moderately disturbed benthic habitat quality, were the result of somewhat shallow RPD depths and a mixture of both Stage I and small Stage III organisms (evidenced by small, indistinct feeding voids). The habitat conditions detected during the July 2002 survey do not appear to be a product of a recent physical disturbance, but rather are likely a function of the significant sand content within both the ambient and deposited material, as well as cold bottom waters. Sandy sediments do not provide an abundance of organic matter to support an active deposit-feeding benthic infaunal community. In addition, cold bottom water temperatures at this site tend to slow the metabolism and foraging activity of resident infauna. As a result, benthic conditions in this area may not be conducive to supporting large populations of Stage III organisms, limiting the amount of bioturbation that occurs within the surface sediments.

There is no evidence of long-term impacts from past dredged material disposal within MADS, and it is anticipated that future placement of organically enriched sediment may, in fact, stimulate the productivity of the seafloor. Future monitoring of MADS should be conducted in late summer/early fall when bottom waters are at their warmest in order to document benthic habitat recovery.